

## Description

Method for admitting an information provider to a method for switching information, and switching device

The invention relates to a method for admitting an information provider to a method for switching information between information providers and information seekers via a switching device. In addition, the invention relates to a corresponding switching device.

The quantity of information which is generally available has recently been increasing in leaps and bounds. The result is that the significance of concepts for accessing information or transmitting or switching information is continuously increasing. Today, information is frequently transmitted via a data transmission system in which switching processes can be automatically performed with the aid of suitable switching devices. Such data transmission systems such as the internet or an in-house intranet are communication networks which consist of a number of computers or servers positioned at arbitrary sites. As a rule, the users of such data transmission systems are connected to the system by means of correspondingly equipped terminals, e.g. terminals, PCs, laptops, mobile radio devices, PDAs etc., equipped, e.g. with suitable interface cards, and can transmit any data to the system or call up any data from the system via the terminals. Such data transmission systems - particularly the internet - have also been increasingly used for trading goods and services in recent years. In this context, on the one hand, the providers of goods or services can present themselves on "web pages", which are technically implemented, for example, on a server of the provider himself, or of a provider of the provider,

connected to the data transmission system or belonging to the data transmission system. The potential customers (also called enquirers in the text which follows) can call up these web pages via the data transmission system and thus inform themselves about the provider and his offers, respectively, or order goods or services directly.

If an enquirer is looking for a particular item or service, there is the possibility, on the one hand, to use a so-called "search engine" as a simple switching device which, by means of the search terms specified, i.e. the enquiry data in this case, lists all web pages found which are correlated with these search terms. On the other hand, an enquirer can also use switching devices provided for such a purpose within the data transmission system. These are special devices which, in most cases, are implemented in the form of software modules on one or more networked servers and which are essentially used for presenting, on the one hand offer data by the most varied providers of a particular item or service and, on the other hand, enquiry data of the individual enquirers, to compare these with one another and to ensure the smoothest possible communication between providers and enquirers. Such switching devices are also called "virtual market places" because of their function similar to a real market place.

Such virtual market places are described, for example, in WO 97/26612 A1. In this document, various market places are accessed by means of an agent system. To each user, a personal agent is allocated. In this context, the software agent is understood to be a device which is capable of performing various delegated electronic actions for the user or another agent. The advantage of this agent system consists in, among other things, that by means of the agents, an

enquirer can be anonymously active on the most varied markets in order to compare and to evaluate the most varied products and to buy products.

However, a fundamental problem of all previously known switching devices occurs when the goods for which the enquirer is looking for a suitable provider are valuable information such as, for example, demographic information procured and assembled with great effort, patient data, information on industrial rights etc. Unlike the case of a material product such as, e.g. a television set, computer or also a particular known software, the extent and quality of what the enquirer is ultimately receiving from the provider in the case of a purchase is not apparent right away. As a rule, therefore, before concluding the trade, the enquirer would like to know as accurately as possible what information he can obtain with what quality from the provider in order to ensure that this is the information wanted by him. On the other hand, the provider cannot communicate the information for the enquirer, or generally provide it to the switching devices, even before a binding agreement about the trade because the information only has value for as long as it is not generally known and cannot be procured at any time by the enquirer even without payment to the provider. When the above switching devices are used for finding information providers, the enquirers currently have to rely on trusting the provider, for example because they already know the provider from previous information purchases or have obtained recommendations for this provider from other enquirers.

It is the object of the present invention to specify a method for admitting an information provider to a method for switching information, and a switching device by means of which an information-seeker

is enabled to efficiently access information which corresponds to the requirements of the information-seeker.

This object is achieved by a method as claimed in claim 1 and by a switching device as claimed in claim 11. Advantageous and suitable further developments of the invention are specified in the dependent claims. The invention also comprises developments of the device claims which correspond to the dependent method claims.

According to the invention, test data are transmitted by an information provider to the switching device and received by the switching device, the test data representing information offered by the respective information provider. The quality of the test data is evaluated by the switching device and the information provider is admitted to the method for switching information between information providers and information-seekers by the switching device in dependence on the quality of the test data.

Thus, only those information providers or only information from those information providers which have demonstrated by the provision of test data that the corresponding information or data offered has sufficiently high quality are admitted to the method for switching information.

The evaluation of the quality of the test data and the admission of information providers depending on this can be implemented, in particular, by a security layer which is provided in the switching device, by the switching device or in connection with the switching device. At the same time, this security layer forms a neutral brokering entity. This makes it possible to prevent an information-seeker from achieving in particular, free access to information even before

information is communicated. In addition, the invention makes it possible to achieve that information seekers participating in the switching method can rely on a predetermined quality of the information offered without themselves having to develop and use elaborate evaluation methods for the quality of the information.

The admission of an information provider to the method for switching information relates, in particular, to a first-time admission of an information provider who has hitherto been unknown to the switching device. However, the invention also includes a case where the admission of an information provider already known to the switching device and having a new set of information is made dependent on the evaluation of the quality of test data which represent the new set of information.

For the evaluation of the quality of test data, various criteria and methods can be used depending on the type of test data. Thus, for example, data from the medical field have a good quality when they are suitable for statistical enquiries for the purpose of medical or pharmaceutical research. This requires that the test data contain not only measurement values but also background information which describes how the measurement values were obtained or, respectively, the boundary conditions of the measurements. For example, blood pressure measurement values only exhibit good quality if, together with the blood pressure measurement values, the corresponding measuring time also belongs to the test data. Specifying the measuring method, which can vary, for example, from hospital to hospital, also increases the quality of the test data and the corresponding information offered. Such background information can be specified in the medical field, for example by specifying the national or international standards or guidelines used during the measurement or the preceding treatment. The presence of ontologies in the information

offered can also indicate a higher quality of information.

A switching device can then be set up, for example, in such a manner that an information provider with its information offered, which relates to blood pressure measurement values, is only admitted to a method for switching information when the evaluation of the quality of the test data transmitted by him in advance shows that these also contain the measuring times.

To enable the method according to the invention to be triggered by an information provider, it is preferably provided that offer signaling data, which have been transmitted by an information provider to the switching device are received and in response to these test request data are sent to the information provider by the switching device.

The method according to the invention is preferably combined with a method for switching information between information providers and information seekers by a switching device in which information enquiry data, which were transmitted by information seekers to the switching device are received and in which information offer data are received which were transmitted by an admitted information provider to the switching device and which represent information offered by the respective information provider. The information enquiry data and the information offer data can then be compared with one another for determining corresponding information enquiry data and information offer data and search result data can be transmitted to a terminal of an information seeker if the information enquiry data of the information seeker correspond to the information offer data of an information provider.

The information offer data preferably only contains some parameters which point out which information is offered. For example, the information offer data can say that data for a particular illness are available, possibly the period from which these data originate and how many data are available. The information offer data should, on the one hand, preferably be extensive enough that a meaningful prior comparison with information enquiry data of the individual information seekers can be performed and, on the other hand, these information offer data should not reveal too much about the information actually offered since, of course, the information represents the actual value.

The search result data can preferably be a list of the information offer data corresponding to the information enquiry data, which, for example, comprises the titles of the information offered or of the information offer data, the names of the information providers, the prices of the information offered, the evaluations and the ranking of evaluation of the qualities of the information offered, the evaluations or the ranking of evaluation of the provider and/or evaluation histories.

To provide for reliable switching, particularly of sensitive person-related or valuable information or data, the transmission of test data, information offer data, information enquiry data and/or search result data between the respective transmitter and receiver is preferably encrypted.

For the long-term, and thus more informative evaluation of information providers and the information offered by these, the admission of the information provider by the switching device to the method for switching information between information providers and information

seekers is preferably made dependent on an evaluation history of the information provider. The evaluation history can be based, in particular, on past evaluations of the quality of test data which have been stored correlated with the corresponding information provider in the switching device.

As an alternative or supplementary thereto, the evaluation history can also be based on past evaluations of the quality of information by information seekers to which the information has been communicated. For this purpose, the evaluation of the quality can be transmitted from the information seeker to the switching device and stored correlated with the corresponding information provider in the switching device.

The invention also comprises a switching device which, apart from an evaluation device which is constructed for evaluating the quality of test data exhibits a provider test interface device for receiving test data which had been transmitted from an information provider to the switching device and which represent information offered by the information provider. In addition, the switching device comprises a control unit which is constructed in such a manner that the admission of the information provider to the switching system is made dependent on the quality of the test data.

The switching system preferably exhibits enquirer function units, associated in each case with the various information seekers in order to initially receive the information enquiry data of the information seekers and automatically forward them to the switching device. Conversely, these enquirer function units can receive the search result data sent out by the switching device for the relevant information seeker and sort and normalize the information offer data



and/or data contained in the search result data via the information provider before the transmission to the information seeker or his terminal. In particular, it is possible to normalize in this manner price information in order to facilitate a comparison between the different offers for the enquirer. The enquirer function units can be configured in a similar manner and have similar functionalities as the personal agents of WO 97/26612 mentioned initially.

In the same manner, provider function units can be allocated in each case to the various information providers in order to initially receive the information offer data of the associated information providers and automatically forward them to the switching device. These provider function units can also receive the information enquiry data matching the information offer data of the information provider and transmitted by the switching device and initiate the detailed comparison with the information, represented by the information offer data, by the associated data comparison device. These provider function units, too, can be configured in similar form as the aforementioned personal software agents.

In principle, the data comparison devices allocated to the individual information providers can also be components of the switching device. In this case, however, this must be a particularly secured area so that the individual provider can store the information there without others being able to look at this information. In principle, the data comparison devices allocated to the individual information providers can also be a number of data comparison devices - only a single data comparison device in the extreme case - which are only temporarily allocated to the individual information providers for the respective comparison operation.

It is particularly preferred, however, if the data comparison devices are in each case a component of the provider function units allocated to the relevant information providers and/or locally installed at the relevant information providers, i.e. on a server or terminal arranged there. This has the advantage that the valuable information does not need to be issued by the information provider but always remains within the sphere of influence of the information provider. In this case, however, it should be preferably ensured that the data comparison devices themselves or the process of the comparison are only subject to the control of the switching system or the switching device and cannot be manipulated by the information providers. This guarantees an objective comparison of the information offered with the information enquiry data of the enquirer.

In the text which follows, the invention will be explained in greater detail with reference to an exemplary embodiment and referring to the attached figures, in which:

Figure 1 shows a diagrammatic representation of an automatic switching system,

Figure 2 shows a flow chart of a method for admitting an information provider to a method for switching information.

The central component of the automatic switching system 1 shown in Figure 1 is a switching device 2. This switching device 2 can be installed, for example, on one or more networked servers in the form of hardware and/or software - and preferably predominantly in the form of software modules. In principle, this can also be a virtual market place already implemented on an internet server or

the like which additionally exhibits the components or software modules, respectively, described in the text which follows or uses these in the manner according to the invention as described in the text which follows if it already has these functionalities.

It is clear that the switching device 2 can also have other components and functionalities that are generally available to the virtual market places or similar switching devices. However, such standard components and functions will not be discussed further in the description following and in the figures.

The switching device 2 has an enquirer interface device 7 via which information enquiry data ND are received by the information seekers  $N_1$  to  $N_n$ .

Communication between the information seekers  $N_1$  to  $N_n$  and the switching device 2 takes place via enquirer function units 3 belonging to the switching system 1. These enquirer function units 3, also called enquirer agents 3 in the text which follows, can be implemented as software modules, for example, and run on a server on which the switching device 2 is also implemented. As an alternative, the enquirer agents 3 can also be implemented as software modules on a terminal of the respective information seeker  $N_1$  to  $N_n$ .

As a subordinate software module, such an enquirer agent 3 contains, on the one hand, an anonymizing unit 12 which initially anonymizes the information enquiry data ND input by the information seeker  $N_1$  to  $N_n$  before it is forwarded to the switching device 2 and, on the other hand, a data conditioning module 15 in order to condition search result data which are to be transmitted from the switching device to the information seeker  $N_1$  to  $N_n$  after a successful search,

for example to sort them by providers or to normalize them with respect to the pricing. Thus, the information seeker  $N_1$  to  $N_n$  is able to compare the individual information offers in a relatively comfortable way.

In the exemplary embodiment shown, the switching device 2 also has a control device 10 which is implemented in the form of a software module on a server. A part of this control unit 10 is a precomparison unit 11 in the form of a software module for comparing information enquiry data ND and information offer data AD for correspondence. In addition, the switching device 2 contains a memory 9 where the information enquiry data ND and information offer data AD are temporarily stored.

The switching device 2 also exhibits a provider interface device 8 in order to receive information offer data AD from various information providers  $A_1$  to  $A_n$ . Here, too, similar to the information seekers  $N_1$  to  $N_n$ , communication with the information providers  $A_1$  to  $A_n$  takes place via the provider function units 4, also called provider agents 4 in the text which follows. The provider agents 4 are installed in the form of software modules on a server of the relevant information provider  $A_1$  to  $A_n$ .

In the exemplary embodiment shown, the provider agents 4 in each case have a data comparison device 5 in the form of a software submodule. This data comparison device 5 is used for comparing information enquiry data ND, transmitted via the switching device 2 to the provider agent 4, with the information  $I_1$  to  $I_n$  actually offered by the information provider  $A_1$  to  $A_n$ . This information  $I_1$  to  $I_n$  is stored in a memory 6 which can be accessed by the respective provider agent 4.

In the exemplary embodiment shown, the provider agents 4, and thus also the data comparison device 5, are automatically installed on the server of the respective information provider  $A_1$  to  $A_n$  by an agent manager 14 of the comparison device 2. The data comparison device 5 is constructed in such a manner that it cannot be modified by the respective information provider  $A_1$  to  $A_n$  and performs the comparison in accordance with the instructions specified by the switching device 2 or, respectively, by the operator of the switching device 2. This variant ensures, on the one hand, that the respective information providers  $A_1$  to  $A_n$  do not need to issue their valuable information  $I_1$  to  $I_n$  and, on the other hand, that an objective comparison of the information offered with the information enquiry data ND of the individual information seekers  $N_1$  to  $N_n$  is performed.

In the exemplary embodiment shown, the provider interface device 8 of the switching device 2 also has an anonymization module 13 which first anonymizes information offer data AD sent to the switching device 2 by the information providers  $A_1$  to  $A_n$ .

The anonymization guarantees for each site, at least during the preliminary comparison, that the individual information seekers and information providers can look for a suitable "partner" without it becoming generally known, particularly to competitors, what type of information the individual information seekers  $N_1$  to  $N_n$  are seeking or, respectively, can be offered by the information providers  $A_1$  to  $A_n$ .

Apart from the provider interface device 8, the switching device 2 has a provider test interface device 16 for receiving test data TD which have been transmitted to the switching device 2 by an information provider  $A_1$  and which represent information  $I_1$  offered by the information provider  $A_1$ . This provider test interface device 16 has been drawn as

a unit with the provider interface device 8. Depending on the variant of embodiment, however, the provider test interface device 16 can also be designed as hardware or software module independent of the provider interface device 8.

The control unit 10 is also connected to an evaluation module 17 which can also be implemented as part of the control unit 10 in accordance with another variant of embodiment. This evaluation module 17 which can be formed as program-controlled processor device is programmed in such a manner that it can perform an evaluation, particularly of the quality of test data TD with regard to certain criteria. The result of the evaluation is transmitted to the control unit 10 and is then used as basis for a decision about admitting an information provider  $A_1$  who has provided the test data TD.

In the memory 9, the evaluation of the quality of the test data TD which have been determined are stored in correlation with the information provider  $A_1$  who has provided the corresponding test data TD, in order to create an evaluation history in the memory 9. This evaluation history can preferably be a supplementary or alternative basis for a decision about the admission of an information provider  $A_1$  associated with the evaluation history.

For the encryption of the data which are transmitted between the switching device 2, the information providers  $A_1$  to  $A_n$  and the information seekers  $N_1$  to  $N_n$ , encryption devices not shown in the drawing are provided at the enquirer function units 3, and the provider function units 4 and at the switching device 2.

In the text which follows, a typical sequence of a method from the signaling of an offer by an information provider to the switching of an information provider to an information seeker

will be explained in greater detail with reference to the flow chart shown in Figure 2. Figure 2 shows to the left of the left-hand dashed line, which represents the provider interface 8 and, particularly, the provider test interface 16, the sequence on the information provider side A, to the right of the right-hand dashed line, which represents the enquirer interface 7, the sequence of the information seeker side, and between the two dashed lines, the sequence at the switching device 2.

In this example, a clinic, as information provider A, signals in a first step (signaling of an offer) to the switching device 2, acting as information broker, by transmitting offer signaling data ASD that it has data relating to blood pressure measurement values to offer to be switched. The switching device thereupon requests, by sending test request data TAD to the clinic A test data TD from the clinic A which thereupon are sent by the clinic A to the switching device 2.

A classifying input filter of the switching device 2 is set up in such a manner that data relating to blood pressure measurement values are forwarded to an evaluation module 17. The quality of the test data TD is then evaluated in the next step (evaluation of the test data) by the evaluation module 17. In this case, it is checked whether the test data TD also comprise the respective measurement time in addition to the blood pressure measurement values. If this is so, the test data TD exhibit adequate quality and the provider A is admitted to the information switching method. If the test data TD do not have the measuring times, the test data TD do not exhibit adequate quality and the provider A is not admitted to the information switching method. In this case,

the method ends by the provider A being informed about the nonadmission and the reasons for the nonadmission.

If the clinic is admitted as information provider, the clinic is requested to send corresponding information offer data AD via its provider agent 4 to the switching device 2 (sending of offer data). These are stored there in the memory 9. These information offer data AD only contain some parameters which describe what information is offered in which extent at which price.

In parallel with or after the admission check, a pharmaceutical undertaking is now looking for blood pressure measurement values and attempting to find a provider, for example a clinic which has such blood pressure measurement values. For this purpose, the enquirer function unit 3 on the enquiry side obtains the information enquiry data ND from the information seeker N, in this case the clinic. This enquirer function unit 3 anonymizes the information enquiry data ND with the aid of its anonymizing module 12 and then forwards the anonymized information enquiry data ND to the switching device 2 (sending of enquiry data).

After the switching device 2 has received the anonymized information enquiry data ND, corresponding information offer data AD are looked for.

This search process, which is not shown in greater detail in the drawing, can have the following form. In the first search method step, the switching device 2 first looks for corresponding information offer data AD in its own database, i.e. a preliminary comparison of the information enquiry data ND with the information offer data AD of the individual information providers  $A_1$  to  $A_n$ , stored in the memory 9, is performed. If this preliminary comparison



has a positive result and matching information offer data AD are found, the switching device 2 sends the information enquiry data to the data comparison device 5 of the relevant information provider or providers  $A_1$  to  $A_n$ . If not, the process jumps back into the main routine.

The information enquiry data ND sent to the individual comparison devices 5 of the potential information providers  $A_1$  to  $A_n$  in the case of a success are there compared with the actual information  $I_1$  to  $I_n$  offered. In the actual exemplary embodiment, in which a pharmaceutical undertaking is looking for blood pressure measurement values, the information enquiry data ND sent to the comparison device 2 by the pharmaceutical undertaking are distributed to the individual hospitals which, according to their information offer data AD, can offer suitable information. The individual clinics, in the computer systems of which the provider agents 4 with the data comparison devices 5 are installed, then perform a comparison without the blood pressure measurement values leaving the secure area of the clinic up to this point in time. During this process, all required types of data which could be of interest to the pharmaceutical undertaking are individually examined step by step, i.e. the information enquiry data ND of the pharmaceutical undertaking are compared in detail with the information  $I_1$  to  $I_n$  to be offered.

The result data VD of the comparison are then sent back to the switching device 2 and, finally, the process jumps back into the main routine.

The comparison result data VD contain, for example, more accurate information about, to what extent and possibly also precisely in what parts the respective information  $I_1$  to  $I_n$  actually covers the information enquiry and the quality exhibited by the respective information  $I_1$  to  $I_n$ . These can simply be values which state that,

for example, the information enquiry can be satisfied up to a certain percentage, or it can also already contain more accurate information, for example that the blood pressure measurement values are also available specifically according to sex or also only for certain ages, for example only for children.

In the case of a positive result of the comparison, that is to say, for example, if the comparison result has achieved a matching above a predetermined threshold, the control unit 10 causes corresponding search result data SD to be sent back to the enquirer agent 3 of the relevant information seeker  $N_1$  to  $N_n$  (sending of search result data).

In the enquirer agent 3, the search result data SD are then conditioned with the aid of the data conditioning module 15. Thus, for example, if the switching device 2 has been successful several times and has found a number of information providers  $A_1$  to  $A_n$  whose information  $I_1$  to  $I_n$  could fit the information enquiry data ND of the respective information seeker, the individual offers can be sorted and possibly also normalized. The search result data SD thus conditioned are then sent to the terminal, as a rule a PC or server, of the information seeker  $N_1$  to  $N_n$ .

At that point, the search result data SD can also already contain information about the respective information provider. A further variant provides that up to this point in time, the information providers  $A_1$  to  $A_n$  are still anonymous and a direct contact between the information seeker  $N_1$  to  $N_n$  and the relevant information provider  $A_1$  to  $A_n$  is only established, for example via the switching device 2, when the information seeker  $N_1$  to  $N_n$  is interested in the respective information  $I_1$  to  $I_n$ . Furthermore, it is also possible that the exchange of information and the

Payment are preformed completely anonymously with the aid of the switching device 2, the switching device 2 having to be equipped correspondingly in this case in such a manner that it has the required payment functionalities so that the information seeker  $N_1$  to  $N_n$  makes the required payment before he obtains the information  $I_1$  to  $I_n$  from the information provider  $A_1$  to  $A_n$  or, respectively, from the switching device 2. The most varied methods for guaranteeing reliable payment via a data transmission system such as the internet are known to the expert.

Finally, it is pointed out again that the system architecture and the method sequence shown in the figures are only exemplary embodiments which can be widely varied by the expert without departing from the scope of the invention.

Thus, for example, a multiplicity of various methods, known per se, can be used individually or in combination for evaluating test data TD. The anonymization modules 12 or the data conditioning modules 15 can also be centrally implemented in the switching device 2 instead of in the individual enquirer agents 3. Conversely, the anonymization module 13 can be implemented in each case in the form of individual modules in the provider agents 4.

Furthermore the switching device 2 can have - unlike the drawings in the figures - e.g. also separate enquirer interface devices for receiving information enquiry data ND of the information seekers and for sending search result data SD to the terminals of the relevant information seekers or correspondingly have separate provider interface devices 8 for receiving information offer data AD of the information providers and for sending information enquiry data ND to the data comparison

devices 5 of the various information providers  $A_1$  to  $A_n$ .

The search process can also be performed completely centrally in the switching device 2 after the information needed for this has first been transmitted to the switching device.

Instead of blood pressure measurement values or patient data for a particular type of illness, the data can also be, in particular, demographic data, for example customer data which an undertaking wishes to acquire in order to perform on the basis of these data a consumer analysis by means of which it can then better orientate its own offer.